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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 31 1980

Docket No. 50-339

Mr. J. H. Ferguson
Executive Vice President - Power
Operations
Virginia Electric & Power Company
P. O. Box 26666
Richmond, Virginia 23261

Dear Mr. Ferguson:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE NORTH ANNA POWER STATION, UNIT 2 FINAL SAFETY ANALYSIS REPORT (FSAR)

As a result of our continuing review of the North Anna FSAR, we find that we need additional information to complete our evaluation. The specific information required is related to containment sump performance and is listed in the enclosure.

Our review schedule is based on the assumption that this additional information will be available for our review by June 20, 1980. If you cannot meet this date, please inform us within seven days after receipt of this letter so that we may revise our schedule accordingly.

Please contact me if you desire any discussion or clarification of the enclosed request. I may be reached at 301/492-7100.

Sincerely,

Alexander W. Dromerick

Alexander W. Dromerick
Project Manager
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Enclosure:
Request for Additional
Information

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Enclosure

Request for Additional Information - Containment Sump
North Anna Power Station, Unit 2

Background

The safety issue of containment emergency sump performance under post-LOCA conditions can be viewed as two parts: (1) containment sump hydraulic performance (i.e., providing adequate NPSH to the recirculation pumps with up to 50 percent of the sump screen area blocked), and (2) the effects of debris. The first part, sump hydraulic performance, has previously been addressed in the North Anna Plant, and has been acceptably resolved as is stated in the Section 6.3.4 of Supplement No. 8 to the SER. The problem addressed herein is the potential for debris from insulation and other sources within containment to collect and compromise the ability of the ECCS to recirculate coolant from the containment sump through the recirculation system heat exchangers to the vessel. The following additional information is requested. For items that have been previously resolved, you may respond by referring to the previous documentation.

1. In addition to insulation debris resulting from LOCA effects, debris can be generated within the containment from other sources, such as (1) degraded materials (paint chips), and (2) items which are taken into and left in the containment following maintenance and inspection activities.

   Describe how the housekeeping program for the North Anna Unit 2 will control and limit debris accumulation from these sources. The objective is to assure that debris capable of defeating the post-LOCA core cooling function are identified and removed from the containment.

The response should include references to specific procedures or other means to assure that "as licensed" cleanliness will be attained prior to initial operation and prior to each resumption of operation.

2. Address the degree of compliance of North Anna Unit 2 with the following recommendation which is also set forth as item C.14 of Regulatory Guide 1.82:

"Inservice inspection requirements for coolant pump components (trash racks, screens, and pump suction inlets) should include the following:

a. coolant sump components should be inspected during every refueling period downtime, and

b. the inspection should be a visual examination of the components for evidence of structural distress or corrosion."

3. As stated in Supplement No. 8, a scale model test of the North Anna sump design has been successfully conducted to show that adverse hydraulic phenomena which would impede long-term cooling of the core following a LOCA will not occur. This testing was performed with up to fifty percent of the sump screens blocked. The responses to the following concerns are required to support this assumption.

a. FSAR page 6.2-63 Amendment 65 states that seven types of insulation are used in the containment. For each type provide the following information:

(1) The manufacturer, brand name, volume and area covered.

(2) A brief description of the material and an estimate of the tendency of this material either to form particles small enough to pass through the fine screen in the sump or to block the sump trash racks or sump screens.

(3) Location of the material (metal mirrored, foam glass, foam rubber, foam concrete, fiberglass, etc.) with respect to whether a mechanism exists for the material to be transported to the sump.

b. We will require the following additional information concerning the design of the containment sump.

(1) Provide an estimate of the amount of debris that the sump inlet screens may be subjected to during a loss-of-coolant accident. Describe the origin of the debris and design features of the containment sump and equipment which would preclude the screens becoming blocked or the sump plugged by debris. Your discussion should include consideration of at least the following sources of possible debris; equipment insulation, sand plug materials, reactor cavity annulus sand ranks or sand bags for biological shielding, containment loose insulation, and debris which could be generated by failure of non-safety related equipment within the containment. Entry of sand plug materials into the containment sump and the possibility of sand covering the recirculation flow from the containment should be specifically addressed.

(2) We have reviewed the letter of S. C. Brown, VEPCO, to Mr. E. G. Case, NRR, dated March 23, 1978 relative to this issue. It is not apparent from a reading of the letter's attachment what percentage of the containment was included in the pump tests relative to the volumes and surface areas which would be effective in a post-LOCA ECCS recirculation mode. It is also not apparent what the total weight of the debris was in each particle size class on table C.

Please provide this information along with your conclusion regarding the percentage of the screens which would be expected to be blocked by particles of all sizes, including those greater than 250 mils.

c. With respect to the conclusion that debris with a specific gravity greater than unity will settle before reaching the sump cover, consider the potential for flow paths which may direct significant quantities of debris laden coolant into the lower containment in the vicinity of the sump and the availability or lack of sufficient horizontal surface areas or obstructions to promote settlings or holdup of debris prior to reaching the sump.

d. Does metal mirror insulation house other materials, fibrous or otherwise, which could become debris if the insulation were blown off as a result of a LOCA?

e. If the North Anna containment contains loose insulation, include examples of how the insulation will be precluded from reaching the sump.

4. The resolution of the concerns noted above plus the provisions of adequate NPSH under non-debris conditions, and adequate housekeeping practices are expected to reduce the likelihood of problems during recirculation. However, in the event that LHSI recirculation system problems such as pump cavitation or air entrainment do occur, the operator should have the capability to recognize and contend with the problems.

Both cavitation and air entrainment could be expected to cause pump vibration and oscillations in system flow rate and pressure. Show that the operator will be provided with sufficient instrumentation and appropriate indications to allow and enable detection of these problems. List the instrumentation available giving both the location of the sensor and the readout.

The incidence of cavitation, air entrainment or votex formation could be reduced by reducing the system flow rate. The operator should have the capability to perform indicated actions (e.g., throttling or terminating flow, resort to alternate cooling system, etc.). Show that the emergency operating instructions and the operator training consider the need to monitor the long-term performance of the recirculation system and consider the need for corrective actions to alleviate problems.

5. Provide a schematic drawing of the post-LOCA water level in the containment during the recirculation mode relative to the elevation of the ECCS sump floor. Include on this drawing the location of the containment water level sensor and the elevations correspond to readings of zero and 100% pf range on the control room indicator.

6. Provide several large scale drawings of the containment structures, systems and components at elevations.

7. Does North Anna Unit 2 utilize sand or similar materials in the containment during power operation for purposes such as reactor cavity annulus biological shielding (e.g., sand tanks or sand bags) or reactor cavity blow out sand plugs?